Math 155 — Epidemiology — Prof. Kaplan

Health-Care Choices

Problem 1

In budgeting for health-care, policy makers need to decide what are the best ways to spend the available funds. One way for analyzing the possibilities involves examining the impact of spending the money in different ways, measured by "Quality Adjusted Life Years," QALYs.

Suppose that each year, vaccinations given to children save 100 lives. Since children can be expected to live another 70 years or so, those vaccinations would be credited with 70×100 life years. The point of "quality adjusted" is to take into account that many health interventions preserve the lives of people who have substantial disability or distress.

The graph below shows a hypothetical situation of three different interventions, labelled A, B, and C. Each curve shows the number of QALYs that would result from spending the indicated amount of money. By spending more money on an intervention, you can reach more people or produce a better outcome for those people who are reached.
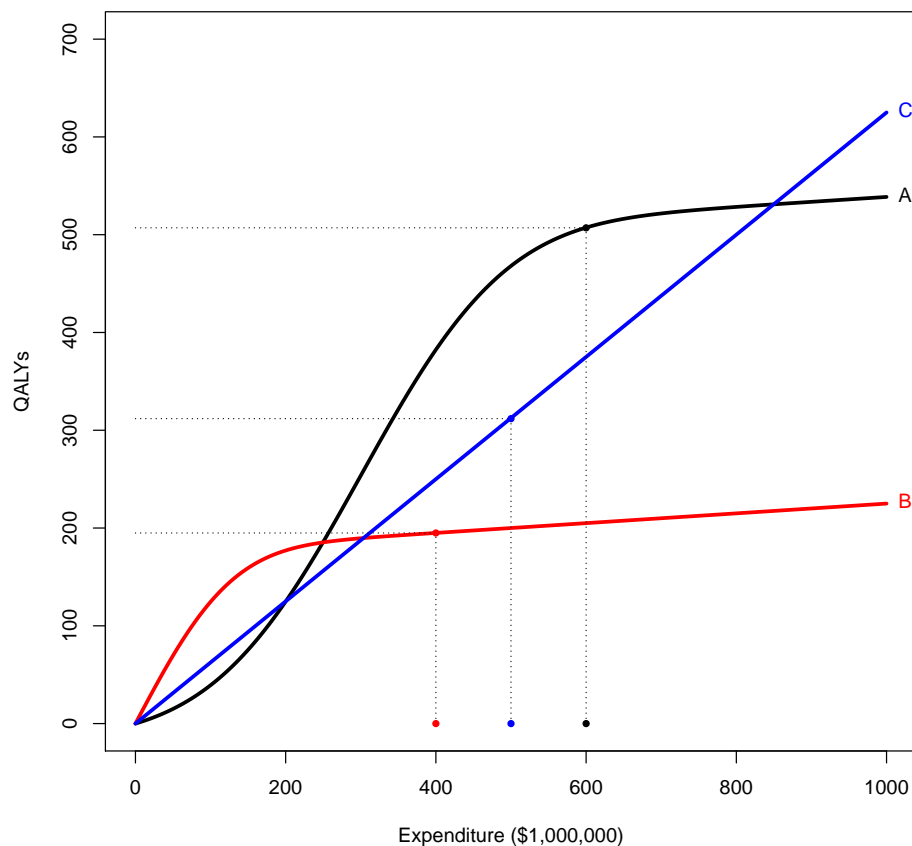
The current health policy is indicated by the dots on each curve: $600 million for A, $400 million for B, and $500 million for C. Notice that the money amounts add up to a total of $1500 million. That's the budget.

1. At the money allocation policy shown in the graph, how many QALY's would result for a $1 million increase in funding for policy A?

2. If you had to cut the budget by $1 million, which single intervention, A, B, or C, would you reduce funding for?

3. Give an allocation policy that improves the total number of QALYs, summed across the three interventions, but stays within the total budget of $1500 million? Explain the strategy that you used to find the improved allocation?

4. Give a general statement about what sort of allocation of money among A, B, and C would give the largest possible total number of QALYs, summed across the three interventions, and staying within the total budget of $1500 million.